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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/674,645	09/30/2003	John Bruley	YOR920030263US1 (16786)	4799
23389	7590	10/05/2004	EXAMINER PERT, EVAN T	
SCULLY SCOTT MURPHY & PRESSER, PC 400 GARDEN CITY PLAZA GARDEN CITY, NY 11530			ART UNIT 2829	PAPER NUMBER

DATE MAILED: 10/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/674,645	Applicant(s) BRULEY ET AL.	
	Examiner Evan Pert	Art Unit 2829	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 2 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☒ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) _____ is/are rejected.
- 7) ☒ Claim(s) 1-20 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>0104</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities:
 - Throughout the specification and claims, applicant seemingly incorrectly refers to "titanium, hafnium or zirconium" as being "Group IVA metals," when these metals should seemingly properly be referred to as --Group IVB metals— [e.g. see "Periodic Table of Elements" in the textbook entitled "General Chemistry" to Ebbing et al.]. Applicant is required to correct or modify the reference to "Group IVA metals" throughout the specification to clearly strictly refer to --titanium, hafnium, zirconium or unnilquadium-- (i.e. at [0010], [0014], [0015], [0019], [0020], [0024] and [0043]).
 - At [0007], the last word on page 2 should read --too-- rather than "to."

Appropriate correction is required.

Claim Objections

2. Claims 1-20 are objected to because "Group IVA," per item 1 above, does not clearly refer to the elements "titanium, hafnium, zirconium or unnilquadium," which are disclosed for practicing applicant's invention. Appropriate correction is required.

Allowable Subject Matter

3. Claims 1-20 are objected to for the potentially misleading nomenclature set forth above, but are otherwise allowable.

4. The following is a statement of reasons for the indication of allowable subject matter:

Regarding claims 1-16, the prior art does not disclose applicant's claimed "method," particularly characterized by a step of "forming a *nitrogen passivation layer*" on a silicide *before* depositing a metal layer comprising "titanium, hafnium, zirconium or niobium," wherein "the nitrogen passivation layer restricts diffusion between the metal layer and the silicide" (i.e. restricts unwanted diffusion during an anneal that forms a diffusion barrier at the surface of the metal layer per [0047]).

Regarding claims 17-20, the prior art does not disclose applicant's "via interconnect silicide junction" particularly characterized by "an amorphous metal silicide region atop a silicide region," the amorphous metal silicide region *having a thickness of* "less than about 3 nm." Evidence is lacking that prior art has achieved a thickness less than about 3 nm for the amorphous layer, in context of the other claimed elements, while applicant has achieved this thickness using a "nitrogen passivation layer" [0040-0042 + 0047].

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The four patents cited by the examiner are related in that they disclose methodology for making contacts with silicide having diffusion barriers, but these references do not disclose a "nitrogen passivation layer," in the context of applicant's disclosure:

Perhaps the closest prior art is U.S. 5,047,367, which discloses TiN on CoSi₂, as preferred by applicant per [0047]. However, the '367 patent is silent about the thickness of an amorphous portion of the cobalt silicide, and evidence is lacking that the disclosure of the '367 patent, or any other reference, achieves applicant's claimed thickness of "less than about 3 nm."

6. This application is in condition for allowance except for the following formal matters:

Correction or modification of the phrase "Group IVA metals" to clearly indicate that applicant is strictly speaking of "titanium, hafnium, zirconium or unnilquadium."

Prosecution on the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

A shortened statutory period for reply to this action is set to expire **TWO MONTHS** from the mailing date of this letter.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Evan Pert whose telephone number is 571-272-1969. The examiner can normally be reached on M-F (7:30AM-3:30 PM).

7. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Tokar can be reached on 571-272-1812. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2829

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ETP
September 22, 2004


EVAN PERT
PRIMARY EXAMINER